Organizational creativity and sustainability-oriented innovation as drivers of sustainable development: overcoming firms' economic, environmental, and social sustainability challenges

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Keywords: sustainability, environmental, economic, social, sustainable development, sustainability performance, SME, mediation effect, organizational creativity, innovation, manufacturing.

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Abstract

Purpose: Sustainable development is key to firms' competitiveness, survival, growth, and profitability, although sustainability emerges as a great challenge. The aim of this study is to analyze the links between organizational creativity (which integrates sustainability orientation), sustainability-oriented innovation, and the multidimensionality of firms' sustainability performance.

Design/methodology/approach: A total of 417 valid responses from manufacturing SMEs were collected through a questionnaire. PLS-SEM is the statistical technique used in the hypothesis testing.

Findings: Organizational creativity (which integrates sustainability orientation) and sustainability-oriented innovation are positively associated with economic sustainability performance, environmental sustainability performance, and social sustainability performance; sustainability-oriented innovation has a partial mediation effect on the relationship between organizational creativity and economic, environmental, and social sustainability performance; and organizational creativity (which integrates sustainability orientation) has a positive effect on sustainability-oriented innovation.

Originality: Sustainability orientation is integrated into organizational creativity without limiting it, sustainability-oriented innovation encompasses innovation and sustainability in all its breadth without forgetting the innovation process openness, and firm's sustainability performance has a multi-dimensional approach. Such innovation and creativity contribute –in an interconnected way– to sustainable development, as well as overcoming sustainability challenges and firms' barriers to sustainability. Likewise, the aforementioned creativity must be implemented throughout the company, even beyond its contribution to the innovation process. Thus, the implementation of new ideas, thoughts, perspectives, views, and mental models –fruit of the described creative process– will generate new models and paths in which firms' profitability, growth and survival are related with overcoming environmental and social problems.

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1. Introduction

Sustainability is becoming an imperative for firm's survival, growth, and profitability, due to the growing concern about the effects and consequences of environmental degradation –with problems as important as climate change, overexploitation of resources, species extinction, biodiversity loss, destruction of ecosystems, and pollution–, social inequality, poverty, and unsustainable economic growth. All this has triggered the

need for a transition towards a more sustainable society and economy, which implies a profound transformation of both (Sroufe, 2017).

The unprecedented need for a transition towards sustainability presents many challenges and barriers (Mitchell and Walinga, 2017). The 2030 Agenda lists global challenges such as climate change, social inequality, and environmental degradation (United Nations, 2015). These sustainability challenges call for a fundamental reorientation of companies (Przychodzen et al., 2016).

Innovation is widely recognized for its capacity to transform entire industries (Klewitz and Hansen, 2014), and creativity for its role as a possible antecedent of innovation (Amabile, 1997; Awan et al., 2019). In this regard, four issues arise in relation to sustainability.

Firstly, creativity is an issue rarely addressed in sustainability studies, with still few contributions that mainly theorize about the role of creativity in sustainability based on the conception of creativity as an antecedent of innovation (Mitchell and Walinga, 2017). This is a consequence of the fact that the creativity field has mainly focused on the impact of creativity on innovation, paying much less attention to the role of creativity in shaping the company's fundamental activities and strategy (Przychodzen et al., 2016). Indeed, organizational creativity is a topic that is often overlooked in sustainability (Shrivastava, 2014), without empirical evidence of its contribution to each one of the three sustainability performance dimensions (Awan et al., 2019; Przychodzen et al., 2016).

Secondly, authors such as Lim (2016), Przychodzen et al. (2016), Abdul-Rashid et al. (2017), and Shahzad et al. (2020), among others, demand more research and emphasize on the multidimensionality of sustainability performance. The underlying problem is that it is not yet clear how to solve current environmental and social problems while profitability is obtained (Przychodzen et al., 2016). In fact, there is a research gap with respect to the understanding of how to integrate the achievement of financial, social, and environmental benefits simultaneously (Sroufe, 2017).

Lim (2016) pointed out that the three dimensions of sustainability must be pursued at the same time, collectively, in a well-balanced way. However, the current literature focuses mainly on sustainability performance in a one-dimensional way, despite the need and scarcity of publications that simultaneously consider the economic, environmental, and social aspects of sustainability (Abdul-Rashid et al., 2017). In addition, sustainability is sometimes even approached in a biased way. In this regard, a large part of the sustainability articles ignores the economic and social aspects of sustainability, focusing on the environment and dealing with low ecological impacts (Büyüközkan and Karabulut, 2018). The social dimension is often overlooked (Schiederig et al., 2012); even in SMEs, the scarce literature on sustainable development mostly has not considered the social dimension of sustainability (Sajan et al., 2017). Consequently, the creation of economic value, while social and environmental challenges are addressed, is underdeveloped in the existing literature in spite of its considerable theoretical and practical importance for organizations' long-term survival in a competitive environment (Przychodzen et al., 2016). The limited evidence –regarding the three dimensions of sustainability– lies in applying or optimizing current models or adjusting the status quo, which leads to the fact that it can sometimes be argued that a dimension is not affected or its impact is not assured, especially in sustainability performance (Dey et al.,2020).

Thirdly, how and through which vias creativity influences firm performance is a question under research, since although the relationship between both variables is defended, many

innovations fail to obtain economic returns and many new ideas never become converted in an innovation (Przychodzen et al., 2016). In SMEs, organizational creativity continues to raise important questions, for issues such as overcoming resource constraints (Balau et al., 2020).

Fourthly, the complexity, ambiguity, and uncertainty related to sustainability mean that the aforementioned process of change requires a differentiated treatment in the literature, to address its specificities and unique challenges (Mitchell and Walinga, 2017). In this context, the analysis and evaluation of the company's activities that have integrated sustainable development is critical, as well as covering the three sustainability dimensions (Sroufe, 2017). Accordingly, the development of the specialized literature on sustainability demands quantitative empirical evidence that corroborates previous premises and theorizations. In view of which, to date, only a few empirical studies have emerged that have addressed the impact of green innovation and eco-innovation on sustainability performance. However, green innovation and eco-innovation do not encompass the full breadth of sustainability-oriented innovation. Because of this, there are still no-conclusive results even about the link between sustainability-oriented innovation and environmental and social issues (Dey et al., 2020). Adam et al. (2016) attribute such matter to the use of the SOI label in parts or aspects of the phenomenon –without fully covering it–, addressing only social or environmental issues, which leads to sustainability-oriented innovation in many cases being addressed only with what it is actually green innovation or eco-innovation (see Dey et al., 2020). Whilst other authors, such as Awan et al. (2019), highlight that there is not even consensus on previous issues such as the relationship between green innovation and firm performance. Similarly, in the SMEs literature the absence of the social dimension is predominant (Klewitz and Hansen, 2014).

Sustainability studies of SMEs are still scarce, more than those about large firms, although sustainability is the major challenge of today's SME (Klewitz and Hansen, 2014; Sajan et al., 2017; Dey et al., 2018; Dey et al., 2020). Thus, the issues mentioned in the previous paragraphs are more accentuated in the SME literature due to its greater scarcity. Moreover, SMEs are central contributors to sustainable development (Klewitz and Hansen, 2014). The relevance of the study of SMEs sustainability lies in the fact that they –of the world– are the majority of all firms, employ around 60% of the population (Dey et al., 2018), and represent up to 70% of global pollution (Dey et al., 2020). SMEs account for 64% of air pollution (Dey et al., 2020). SMEs also need special attention in their sustainable development, to overcome barriers such as lack of resources (Seidel et al., 2009; Sajan et al., 2017). Research on sustainability performance is somewhat scarce, especially in SMEs (Sajan et al., 2017; Dey et al., 2020). Sustainability performance is a business imperative in manufacturing firms –and manufacturing SMEs–, partly due to pressure from stakeholders (Sajan et al., 2017), although many manufacturing companies address sustainability as a result of being aware of its impact (Dey et al., 2020), many manufacturing SMEs ignore its impact and appear to show an apparent lack of awareness (Seidel et al., 2009).

The aim of this study is to address the lack of empirical evidence, the lack of previous consensus, the treatment of the possible contribution of creativity to sustainability beyond a mere innovation input, and the generation and analysis of the constructs of innovation and creativity that integrate the three sustainability dimensions. Thus, the paper complement and clarify the mentioned topics by analyzing the effects of organizational creativity (which integrates sustainability orientation) on economic sustainability performance, environmental sustainability performance, and social sustainability

performance, both directly and indirectly through sustainability-oriented innovation, as well as subsequently the effect of organizational creativity (which integrates sustainability orientation) on sustainability-oriented innovation, and sustainability-oriented innovation on economic sustainability performance, environmental sustainability performance, and social sustainability performance.

2. Literature review

2.1. Sustainability and sustainability performance

Sustainability has been defined from a multitude of approaches and theories –even from different knowledge areas–, it is a complex and multi-dimensional concept like its own nature (Lintukangas et al., 2019). The term is essentially rooted in the conception of three interrelated dimensions: economic sustainability, social sustainability, and environmental sustainability. This encompasses firm's sustainability, corporate sustainability, and circular economy. Firm's sustainability is an issue of reactive and proactive actions (Wijethilake, 2017), where sustainability must encompass all areas and aspects of a company (Cagnin et al., 2011). A firm is sustainability when it grows, makes profits, does not generate negative effects on the natural environment and the social environment, and contributes to social and environmental well-being. Consequently, sustainability can be seen as an evolution (Cagnin et al., 2011), which demands sustainable development because firms still have important challenges to face to truly achieve sustainability. Sustainable development is a complex issue that dynamically interconnects environment, society, and economy (Geissdoerfer et al., 2017), a form of intragenerational equity (WCED, 1987), and a synchronized development of the three sustainability dimensions. Thus, firm's sustainability can be operationalized in the current context as the process of change and progress oriented towards achieving sustainability, where the company effectively seeks the highest sustainability performance in its three dimensions –in a synchronized manner– and sustainable development.

Firm's sustainability performance assesses firm's sustainability (Wicher et al., 2019). Hence, sustainability performance must address each of the three sustainability dimensions independently (Abdul-Rashid et al., 2017; Lintukangas et al., 2019) –treating them, in any case, with the same importance. This is the way in which firm's sustainability performance can show how firm's sustainability and sustainable development are going.

In the previous literature, the three sustainability performance dimensions has been analyzed empirically in manufacturing firms in relation to the impact of sustainable manufacturing practices –sustainable product design and development, sustainable manufacturing process, sustainable supply chain management, and sustainable end-of-life management– (Abdul-Rashid et al., 2017), a set of green supply chain management practices (Çankaya and Sezen, 2019), lean manufacturing practices –in SMEs– (Sajan et al., 2017), and green manufacturing practices, operational competitiveness, and firm reputation (Afum et al., 2020).

2.2. Organizational creativity

Creativity is the new, original and explosive connection of different associations (Matussek, 1984), the ability to think beyond accepted ideas and conventional thinking patterns, combining previously acquired knowledge in an unprecedented way (Kraft, 2005), new mental models (Lozano, 2014), an ability to abandon habitual ways of thinking and gather sections of previously unconnected knowledge and experience (Geschka, 1983), ability and power to develop new ideas (Weihrich and Koontz, 2005), the generation of novel and appropriate ideas –solutions– to open-ended problems in any domain of human activity (Amabile, 1997), linking the cognitive, affective, and social domains (Runco, et al, 1998), and about solving problems (Reiter-Palmon and Illies, 2004; Mitchell and Walinga, 2017) in an unconventional way. Kraft (2005) argued that it is about divergent thinking, questioning the understanding and thinking of others, amazing original connections, unconventional thought patterns, unconventional perspective and view, unorthodox ideas, and the search for unusual answers by new pathways. Therefore, creativity implies novelty, unusualness, originality, imagination, curiosity, spirit of discovery, experimentation, risk-taking, mental flexibility, and metaphorical thinking, but above all usefulness, focusing on the creation of value. In this sense, creative solutions to problems arise.

The creativity embedded in an organization is so-called organizational creativity, as it arises through individuals working together in a complex social system, influenced by individual and group creativity and the organizational setting (Borghini, 2005). In this study, organizational creativity is conceptualized as an organizational creative process that results in ideas, thoughts, perspectives, views, and mental models that are characterized by their novelty/originality and usefulness/value. Regarding sustainability, it is not limited to, but integrates the sustainability orientation.

2.3. Sustainability-oriented innovation

OECD and Eurostat (2005) described innovation as significantly improved products, processes, or organizational methods. Souto (2015) highlighted the importance of business model innovation and business concept innovation, as well as breakthroughs. Ayuso et al. (2006) and Scuotto et al. (2020) highlighted the need to include sustainable orientation specifically to describe sustainable innovation, which they defined as a combination of innovativeness –sustainable innovative character– and innovation capacity –ability to adopt or implement ideas that contribute to sustainability. Inigo and Albareda (2019) indicated that sustainability-oriented innovation must be considerably openness, becoming more open to external knowledge, ideas, R&D, and new paths to market. Therefore, sustainability-oriented innovation must address economic, social, and environmental sustainability, be open and encompass innovations in product, process, organizational, and business concept and model.

2.4. SMEs characteristics *in sustainability, innovation, and* organizational creativity

Regarding sustainability in SMEs, the literature highlights resource constraints and difficulty to attract finance as its main determinants (Klewitz and Hansen, 2014; Dey et al., 2018), even in manufacturing SMEs (Seidel et al., 2009; Sajan et al., 2017). SMEs also have other barriers to increasing sustainability, such as lack of capabilities, time, and knowledge (Dey et al., 2018), especially those related to sustainability. Based on these characteristics, SMEs are considered to display reactive behaviors toward sustainability.

However, SMEs also have features such as flat organization, founder vision, flexibility, entrepreneurial style (Aragón-Correa et al., 2008), strongly value-driven, and owner-manager (Klewitz and Hansen, 2014). Therefore, SMEs' innovation and sustainability behaviors are proactive and reactive, although proactive strategic behaviors are largely dependent on each SME's resources, capabilities, competencies (Aragón-Correa et al., 2008), and owner-manager behavior.

SMEs can be considered strongly owner-manager driven, especially in their sustainable, innovative (Klewitz and Hansen, 2014), and creative behavior. Consequently, addressing the sustainability challenges and disruptive innovations to sustainability problems is considerably influenced by owner-manager' innovation and sustainability vision and commitment.

Klewitz and Hansen (2014) identified five SMEs' profiles in relation to innovation and sustainability: resistant SMEs –ignore sustainability–, reactive SMEs –respond reactively to external pressures, environmental or social problems is seen as an additional cost–, anticipatory SMEs –anticipate future innovation opportunities, considering environmental and social issues to reduce costs and attempt to stay ahead of regulations–, innovation-based SMEs –proactively seek solutions to environmental and social challenges to achieve competitive advantages and success, limited radical innovations, their interaction with external actors is considerable–, and sustainability-rooted SMEs – change their innovation process and their business model, guiding it towards the environment, social, and economic sustainability and sustainable development, the most oriented towards radical innovations for sustainability, and also those with the greatest interaction with external actors. The approach of sustainability-rooted SMEs is related to the results of Souto (2015), as the implementation of innovative business models and innovative business concepts will significantly influence the achievement of radical and incremental innovations.

Regarding organizational creativity, Balau et al. (2020) pointed out the lack of resources, flat organization, and flexibility as relevant characteristics of SMEs.

3. Hypotheses development

3.1. Organizational creativity and sustainability performance

Existing literature has largely focused on the impact of creativity on innovation (Przychodzen et al., 2016) and firm performance, although less attention has been paid to the link between creativity and SMEs performance, in spite of creativity could be an important determinant of SMEs performance and competitiveness (Samson and Umar, 2020). Creativity is positively and negatively related to firm performance due to the creation-implementation tension (Gong et al., 2013), which suggests that a possible positive contribution to sustainability performance is not so clear. Similarly, it is possible to think, for example, about the cost of generating creative outcomes that are useless. Likewise, novelty and meaningfulness as components of creativity directly improve SMES' performance (Samson and Umar, 2020).

Sustainability requires creative problem solving, creative thinking, divergent thinking, new ideas, (Mitchell and Walinga, 2017; Awan et al., 2019) perspectives, views (Mitchell and Walinga, 2017), and new mental models (Lozano, 2014). Awan et al. (2019) suggest

that creativity could enable sustainable development. Creative thinking is important in sustainability, because it induces changes –as a shift in mindset– (Lim, 2016). Sustainability is a complicated goal, since sustainability challenges are complex and require creative solutions, creative problem-solving, creative way of thinking, and new ideas (Mitchell and Walinga, 2017). To a systemic challenge such as sustainability, it is essential to respond creatively to help improve social and economic resources (Lozano, 2014). Likewise, various studies suggest a possible relationship between creativity and sustainability (Przychodzen et al., 2016; Mitchell and Walinga, 2017; Awan et al., 2019; Lozano, 2014). Accordingly, the first hypothesis is established as follows:

Hypothesis 1(H1): organizational creativity (which integrates sustainability orientation) is positively associated with economic sustainability performance(H1a), environmental sustainability performance(H1b), and social sustainability performance(H1c).

3.2. Organizational creativity and sustainability-oriented innovation

Creativity is essential to initiate innovation, as novel and potentially useful ideas are inputs in the innovation process (Amabile, 1997; Przychodzen et al., 2016). Innovation involves the successful implementation of new ideas (Rosing et al., 2011) and their subsequent exploitation, to which sustainable innovation is no exception. It should also be taken into account that creativity can contribute at any phase of the innovation process, not just the initial stage. Sustainability-oriented innovation requires new ideas (Przychodzen et al., 2016; Samson and Umar, 2020) and creative problem solving applicable to sustainability challenges (Mitchell and Walinga, 2017). Therefore, the second hypothesis is stated as follows:

Hypothesis 2(H2): organizational creativity (which integrates sustainability orientation) has a positive effect on sustainability-oriented innovation.

3.3. Sustainability-oriented innovation and sustainability performance

Sustainability performance has been addressed with respect to innovation, although sustainability-oriented innovation has not yet, much less in relation to each of the three sustainability dimensions. Relatively close to these issues but without taking into account the three dimensions mentioned and addressing sustainability-oriented innovation as green innovation exclusively, Dey et al. (2020) analyzed the relationship of sustainability-oriented innovation (limited to green innovation) on sustainability performance. If we turn to the multi-dimensional analysis of sustainability performance, Shahzad et al. (2020) investigated the positive influence of green innovation on corporate sustainable performance, Ch'ng et al. (2020) found a positive effect of eco-innovation practices on sustainable business performance, Asadi et al. (2020) addressed the positive influence of green innovation on sustainability performance, and Sezen and Cankaya (2013) investigated the effects of green manufacturing and eco-innovation on corporate sustainability performance. In a similar way, Maletič et al. (2016) examined the positive relationship between sustainability-oriented process and product deployment and sustainability-oriented innovation competencies deployment with organizational

performance, innovation performance, economic performance, environmental performance, and social performance.

Damanpour and Gopalakrishnan (2001) found that a high performing depends on innovation. Innovativeness is a major driver of firm performance (Rubera and Kirca, 2012). Sustainability-oriented innovation competencies deployment is important for organizational performance, innovation performance, economic performance, and social performance (Maletič et al., 2016). The movement towards sustainability-oriented innovation involves changes, so the value created can be sustainable (Adams et al., 2016). Geels (2005) pointed out that the benefit is not only for firm' sustainable performance, but also for society and the natural environment. A process of change supported by innovation, capable of modifying the behavior of consumers and entire industries (Geels, 2005). In addition, sustainability performance is positively influenced by green innovation (Asadi et al., 2020; Dey et al., 2020; Shahzad et al. 2020) and eco-innovation (Sezen and Cankaya, 2013; Ch'ng et al., 2020). Hence, the following hypothesis is proposed:

Hypothesis 3(H3): sustainability-oriented innovation has a positive effect on economic sustainability performance(H3a), environmental sustainability performance(H3b), and social sustainability performance(H3c).

3.4. Organizational creativity, sustainability-oriented innovation, and sustainability performance

Innovation is probably the most promising means of achieving sustainability and moving on the path of sustainable development (Hall and Vredenburg, 2003; Ayuso et al., 2006). To do this, innovation practices and processes should be strongly based on creativity (Rosing et al., 2011), as well as on learning and continuous innovation (Aragón-Correa et al., 2008); more than in other situations, due to the further complexity and challenges of sustainable innovations (Inigo and Albareda, 2019). Thus, creativity could allow discovering effective solutions to sustainability problems, although these solutions must be applied in companies for a real impact on sustainability (Awan et al., 2019). In this sense, creativity could provide room for manoeuvre in achieving new and valuable sustainable outcomes (Lim, 2016). Dey et al. (2020) suggest that the balance between creativity and innovation could help achieve sustainability in SMEs. Creativity could be influencing sustainable performance through its implementation in green innovations (Awan et al., 2019). This assumption leads to the following hypothesis:

Hypothesis 4(H4): organizational creativity (which integrates sustainability orientation) has a positive effect on economic sustainability performance(H4a), environmental sustainability performance(H4b), and social sustainability performance(H4c), through its implementation in sustainability-oriented innovation (as a mediator)

Figure 1: conceptual framework and hypotheses

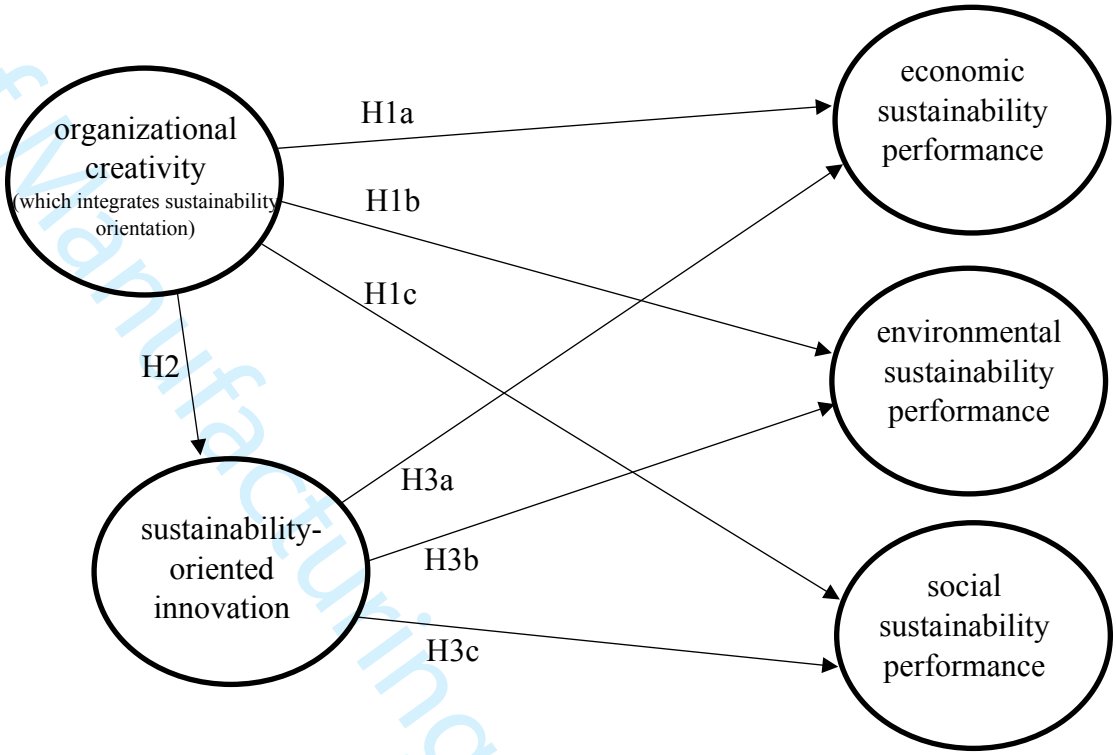
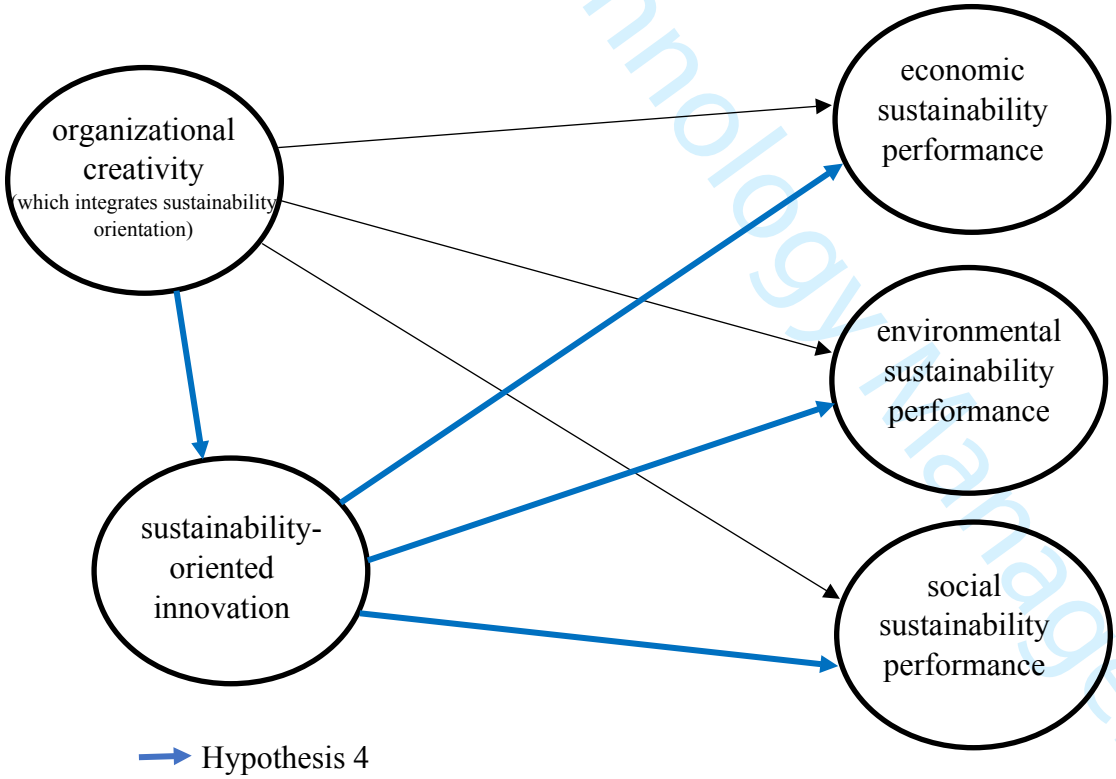


Figure 2: hypothesis 4



4. Methods

4.1 Sample and data collection

The data used for the current analysis have been collected from randomly selected manufacturing SMEs in United Kingdom, Germany, Spain, and Italy. Bureau Van Dijk's Orbis database was used as the sampling frame. The definition of SME is the one used in Europe, consisting of staff headcount of less than 250 employees and either an annual turnover not exceeding € 50 million or an annual balance sheet total not exceeding € 43 million. The data collection instrument was an online questionnaire sent –to the attention of the general manager– by email to a total of 10,000 firms belonging to the NACE Rev. 2 codes section C manufacturing 10-32 (excluding NACE Rev. 2 codes 12 for Manufacture of Tobacco Products).

A pilot study was employed to validate the questionnaire in two parts. Firstly, a draft was sent to five academic experts to comment on its content, clarity, measures, and scaling. Secondly, the improved draft –with the previous comments– was sent to five manufacturing companies to increase understanding of the content and design, in order to get as many responses as possible. Lastly, the final draft was prepared based on the relevant suggestions received in the two outlined steps.

The response rate was 4.3%, after eliminating those with missing data, the valid responses received were 417. The survey was carried out in 2019, aimed at manufacturing SMEs for their added value to the research and practice communities, as well as for generally having significant social and environmental impacts.

Common method bias (in cases where both the dependent and independent variables were obtained from the same respondent) and non-response bias were addressed to ensure the adequacy of the data and the absence of bias. Common method bias was addressed following Podsakoff and Organ (1986), Harman's one-factor test shows that a single factor did not emerge from the factor analysis. Additionally, following the suggestions of Podsakoff et al. (2003), a single factor accounted for less than 50% of variance. Consequently, common method bias is unlikely to affect our data set. Likewise, the respondents' anonymity was communicated and guaranteed. Non-response bias was addressed by analyzing the differences between early respondents and late respondents. The Wilcoxon-Mann-Whitney test –it is advisable not to use t test with Likert-type data– does not show significant differences. Thus, the issue of non-response bias is not a concern.

Table 1: sample characteristics

Firm characteristics	**%**
NACE Rev. 2	
(10 and 11) Manufacture of food and beverages	15
(13, 14, and 15) Manufacture of textiles and footwear	13
(16, 17 and 18) Manufacture of wood and paper, and printing and reproduction	10

(19,20,21, 22 and 23) Manufacture of petroleum, chemical, pharmaceutical, plastic, and non-metallic mineral products	17
(24 and 25) Manufacture of metals	16
(26, 27 and 28) Manufacture of computer, electronics, electric, machinery and equipment	14
(29, 30, 31 and 32) Manufacture of motor vehicles, transport equipment, furniture, and other manufacturing	15

4.2 Data analysis

The statistical technique used is Partial Least Squares Structural Equation Modelling. PLS-SEM is a second-generation statistical technique that ensures a rigorous analysis through two stages: (1) measurement model assesses the relationships between items (observed) and constructs (or unobserved latent variables); and (2) structural model analyses the causal relationships between exogenous and endogenous constructs. The structural model consists of exogenous and endogenous constructs. Endogenous are explained by other constructs in the model and exogenous are not explained (Henseler et al., 2016).

PLS-SEM enables a modelling of the relationships between multiple exogenous and endogenous constructs in a single, systematic, and comprehensive framework. This technique offers a robust and reliable analysis in situations with observed and unobserved variables (latent variables), high-complex models, more than one dependent variable, moderating variables, and mediating variables. The complex network of relationships between constructs can be visually illustrated by graphical structures called "path diagrams". PLS-SEM is exploratory and predictive in nature, in contrast, COV-SEM is confirmatory analysis. In this sense, PLS-SEM is more suitable and efficient to test causal relationships between constructs in complex models (Hair et al., 2011), simultaneously optimizing predictive accuracy and relevance, without making distributional assumptions that constrain the use of Likert data, and with a robust handling of data noise.

The path coefficients can be interpreted as the coefficients in a traditional regression. The t-statistics are calculated using non-parametric bootstrapping procedure, with 5,000 random subsamples. SEM also allows for observed or latent variables to be included as predictors or dependent variables. Due to minimum requirements for residual distributions and measurement scales, Likert scales, and dichotomous variables are acceptable (Henseler et al., 2016).

The software package used is SmartPLS.

4.3. Measurement of the variables

An extensive literature review was conducted to identify valid measures for each construct (see table 2). The items used in the operationalization of each construct are: seven in economic sustainability performance (ECSP), six in environmental sustainability performance (ENSP), five in social sustainability performance (SOSP), five in sustainability-oriented innovation (SOI), and five in organizational creativity (which integrates sustainability orientation) (OC). The items were adapted from previous studies

(see table 2). A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was adopted as the items measure.

The ECSP, ENSP, and SOSP are endogenous latent variables, OC is exogenous latent variable, and SOI is mediator latent variable. A mediator carries the influence of an independent variable on a dependent variable.

The firm size (TAM) is included in the model as control variable, using the number of employees as an indicator.

Table 2: Constructs, measurement items, and sources

Construct	Item	Source
ECSP	Profit growth (ECSP1)	Zhu et al. (2007) Abdul-Rashid et al. (2017) Fayezi et al. (2019) Çankaya and Sezen (2019) Afum et al. (2020) Agyabeng-Mensah et al. (2020)
	Sales growth (ECSP2)	
	Increase in market share (ECSP3)	
	Decrease in production costs (ECSP4)	
	Decrease in environmental fines and charges (ECSP5)	
	Increase in return on equity (ECSP6)	
	Increase in return on assets (ECSP7)	
ENSP	Improvement in the company's environmental situation (ENSP1)	Zhu et al. (2007) Abdul-Rashid et al. (2017) Fayezi et al. (2019) Çankaya and Sezen (2019) Afum et al. (2020) Agyabeng-Mensah et al. (2020)
	Reduction in waste (ENSP2)	
	Reduction in air emission (ENSP3)	
	Decrease in consumption of hazardous/harmful/toxic materials (ENSP4)	
	Reduction in resources consumption (energy, raw materials, etc.)(ENSP5)	
	Increase in the use of renewable energy and recycled materials (ENSP6)	
SOSP	Increase in living quality of surrounding community (SOSP1)	Abdul-Rashid et al. (2017) Çankaya and Sezen (2019) Afum et al.(2020) Agyabeng-Mensah et al. (2020)
	Increase in employees' occupational health and safety (SOSP2)	
	Increase in job satisfaction levels of employees (SOSP3)	
	Increase in relationship with the community and stakeholders (SOSP4)	
	Increase in the development of employee skills (SOSP5)	
OC	Large number and variety of original and useful ideas (OC1)	Amabile (1997) Reiter-Palmon and Illies (2004) Borghini (2005) Kraft (2005) Mitchell and Walinga (2017)
	Unconventional and useful perspectives and views, and unorthodox ideas (OC2)	
	Creative problem-solving (OC3)	
	Sustainability-oriented creative thinking and creative action (OC4)	
	Original and useful ideas, perspectives and views oriented towards sustainable development (OC5)	

SOI	Significantly improved products, processes and/or organizational methods oriented toward increasing sustainability (SOI1)	OECD and EUROSTAT (2005) Ayuso et al. (2006) Souto (2015) Inigo and Albareda (2019) Scuotto et al. (2020)
	Radical innovation (breakthrough) oriented toward increasing sustainability (SOI2)	
	Business model innovation and/or business concept innovation with an important contribution to increasing sustainability (SOI3)	
	Sustainable innovativeness and sustainable innovation capacity (SOI4)	
	Open sustainability innovation (SOI5)	

5. Results

In this section, as mentioned above, the PLS-SEM results are presented following the two steps of this type of analysis, firstly, the measurement model and, secondly, the structural model (including hypotheses testing).

5.1. Measurement model

The measurement model assesses the reliability and validity of the constructs. Table 3 shows loadings, composite reliability, Cronbach's alpha, and average variance extracted (AVE). The loadings are all above the threshold of 0.7 suggested by Hair et al. (2017), which evidences a good individual reliability. According to Henseler et al. (2016), internal consistency reliability is highly satisfactory, because the values of composite reliability and Cronbach's alpha are above the cut-off value of 0.7. The average variance extracted (AVE) is above the minimum value of 0.5 (Fornell and Larcker, 1981), showing an excellent level of convergent validity. Table 4 details the cross loadings, which indicates that each item shows the highest load on its construct and above 0.70, as recommended by Hair et al. (2017), exhibiting an adequate discriminant validity. Therefore, the measurement model demonstrates the reliability and validity of the constructs.

Table 3: Evaluation of measurement model

Construct	**Item**	**Loadings**	**Cronbach's alpha**	**Composite reliability**	**AVE**
ECSP	**ECSP1**	0.804	0.915	0.932	0.664
	ECSP2	0.825			
	ECSP3	0.805			
	ECSP4	0.821			
	ECSP5	0.801			
	ECSP6	0.815			
	ECSP7	0.832			

ENSP	**ENSP1**	0.837	0.914	0.933	0.7
	ENSP2	0.843			
	ENSP3	0.847			
	ENSP4	0.827			
	ENSP5	0.816			
	ENSP6	0.851			
SOSP	**SOSP1**	0.83	0.884	0.915	0.682
	SOSP2	0.816			
	SOSP3	0.847			
	SOSP4	0.83			
	SOSP5	0.806			
SOI	**SOI1**	0.872	0.917	0.938	0.751
	SOI2	0.836			
	SOI3	0.856			
	SOI4	0.885			
	SOI5	0.883			
OC	**OC1**	0.877	0.919	0.939	0.755
	OC2	0.853			
	OC3	0.89			
	OC4	0.86			
	OC5	0.863			

Table 4: Cross loadings

	ECSP	ENSP	SOSP	SOI	OC
ECSP1	**0.804**	0.241	0.129	0.481	0.240
ECSP2	**0.825**	0.231	0.104	0.429	0.328
ECSP3	**0.805**	0.207	0.077	0.492	0.252
ECSP4	**0.821**	0.228	0.093	0.493	0.300
ECSP5	**0.801**	0.257	0.106	0.474	0.311
ECSP6	**0.815**	0.237	0.091	0.493	0.290
ECSP7	**0.832**	0.248	0.120	0.532	0.280
ENSP1	0.241	**0.837**	0.167	0.483	0.271
ENSP2	0.268	**0.843**	0.226	0.478	0.240
ENSP3	0.225	**0.847**	0.190	0.451	0.291
ENSP4	0.258	**0.827**	0.232	0.469	0.302
ENSP5	0.170	**0.816**	0.129	0.405	0.252
ENSP6	0.281	**0.851**	0.210	0.483	0.294
SOSP1	0.094	0.197	**0.830**	0.308	0.288
SOSP2	0.098	0.160	**0.816**	0.293	0.201
SOSP3	0.067	0.184	**0.847**	0.313	0.284
SOSP4	0.135	0.193	**0.830**	0.303	0.303
SOSP5	0.130	0.220	**0.806**	0.292	0.258
SOI1	0.469	0.540	0.323	**0.872**	0.364
SOI2	0.534	0.425	0.308	**0.836**	0.285
SOI3	0.501	0.417	0.290	**0.856**	0.274
SOI4	0.515	0.479	0.333	**0.885**	0.327
SOI5	0.565	0.524	0.329	**0.883**	0.310
OC1	0.317	0.295	0.270	0.303	**0.877**
OC2	0.319	0.250	0.231	0.355	**0.853**

OC3	0.305	0.312	0.267	0.275	**0.890**
OC4	0.312	0.277	0.290	0.310	**0.860**
OC5	0.270	0.296	0.351	0.325	**0.863**

5.2. Structural model

The estimation of the structural model is carried out by introducing an initial model (model 1), in order to determine if there is a full mediation effect. This type of mediation implies that the mediated variables cease to have a significant direct effect.

Table 5 details the coefficients (β) and significances of the direct effects, indirect effects, and total effects in the model 1 and in the model 2, as well as R^2 and SRMR. The R^2 is a measure of the model's predictive accuracy, with a recommended minimum value of 0.1 (Falk and Miller, 1992). The SRMR is a model fit criterion, the values bellow 0.08 determine an acceptable goodness of fit (Hu and Bentler, 1998). The model 1 and the model 2 have R^2 and SRMR above thresholds (as can be seen in table 5), especially the model 2, with excellent predictive accuracy and goodness of fit. In fact, the model 2 explains the variance of 37 % for economic sustainability performance, 33 % for environmental sustainability performance, and 17.7 % for social sustainability performance. Tenenhaus et al. (2005) suggest another global fit measure for PLS-SEM, whereupon Wetzels et al. (2009) propose 0.36 or higher values as a large goodness of fit (GoF) and 0.25 values as a medium GoF. The GoF of the model 1 (0.28) is acceptable and the model 2 (0.45) is excellent.

Stone-Geisser's (Q^2) was obtained by running the blindfolding procedure, in order to determine the predictive relevance of the model. A model has predictive relevance when Q^2 values are > 0 for endogenous constructs. The Q^2 values for ECSP (0.25), ENSP (0.23), and SOSP (0.12) in the model 2 and ECSP (0.09), ENSP (0.08), and SOSP (0.07) in the model 1 are larger than zero, which evidence that the models have predictive relevance.

The model 1 shows that OC has a positive direct effect on ECSP (β=0.347, p<0.001), ENSP (β=0.332, p<0.001), and SOSP (β=0.327, p<0.001). Similarly, the model 2 indicates that OC also has a significant direct effect on ECSP (β=0.155, p<0.001), ENSP (β=0.151, p<0.002), and SOSP (β=0.223, p<0.001) and that OC has a positive total effect on ECSP (β=0.349, p<0.001), ENSP (β=0.334, p<0.001), and SOSP (β=0.326, p<0.001). Hence, organizational creativity (which integrates sustainability orientation) is positively associated with economic, environmental, and social sustainability performance, implying that hypotheses 1, 1a, 1b, and 1c are supported.

The model 2 details that OC has a positive direct effect on SOI (β=0.361, p<0.001), so hypothesis 2 is supported. Also, SOI is directly and positively related to ECSP (β=0.537, p<0.001), ENSP (β=0.508, p<0.001), and SOSP (β=0.286, p<0.001), providing support for hypotheses 3, 3a, 3b, and 3c. Likewise, OC has a positive indirect effect on ECSP (β=0.194, p<0.001), ENSP (β=0.184, p<0.001), and SOSP (β=0.103, p<0.001) through SOI. Therefore, sustainability-oriented innovation has a partial mediation effect on the relations between organizational creativity (which integrates sustainability orientation)

and economic sustainability performance, environmental sustainability performance, and social sustainability performance, supporting hypotheses 4, 4a, 4b, and 4c.

Table 5: Direct coefficients, indirect coefficients, total coefficients, R^2, SRMR, and the results of the hypotheses testing.

	Model 1	**Model 2**			**Hypothesis support**	
		Direct effects	**Indirect effects**	**Total effects**		
		Coefficient	**Coefficient**	**Coefficient**		
OC→ECSP	0.347***	0.155***		0.349***	H1a supported	H1 supported
OC→ENSP	0.332***	0.151**		0.334***	H1b supported	
OC→SOSP	0.327***	0.223***		0.326***	H1c supported	
OC→SOI		0.361***		0.361***		H2 supported
SOI→ECSP		0.537***		0.537***	H3a supported	H3 supported
SOI→ENSP		0.508***		0.508***	H3b supported	
SOI→SOSP		0.286***		0.286***	H3c supported	
TAM→ECSP	0.088*	0.023		0.023		
TAM→ENSP	-0.007	-0.067		-0.067		
TAM→SOSP	0.029	-0.006		-0.006		
OC→SOI→ECSP			0.194***		H4a supported	H4 supported
OC→SOI→ENSP			0.184***		H4b supported	
OC→SOI→SOSP			0.103***		H4c supported	
R^2 ECSP	0.133	0.37				
R^2 ENSP	0.11	0.33				
R^2 SOSP	0.109	0.177				
R^2 SOI		0.13				
SRMR	0.067	0.052				

* Significant at p-value < 0.05 ** Significant at p-value < 0.01 *** Significant at p-value < 0.001

6. Discussion

6.1. Sustainability and firm transformation

Sustainability involves the transformation of companies to facilitate their development regarding the three sustainability dimensions in a synchronized manner.

Accordingly, on the one hand, (1) economic sustainability leads to profit growth, sales growth (Çankaya and Sezen, 2019), increase in market share (Abdul-Rashid et al., 2017), decrease in production costs (Fayezi et al., 2019), and increase in returns (Afum et al., 2020); (2) environmental sustainability entails improving the company's environmental situation (Afum et al., 2020) and reducing waste, emissions (Çankaya and Sezen, 2019), and resource consumption, and increasing recycling; and (3) social sustainability encompasses increasing the quality of life of the community (Abdul-Rashid et al., 2017), enhancing the relationship with the community, and improving the safety, health, well-being (Çankaya and Sezen, 2019), satisfaction, and skills of the employees (Afum et al., 2020).

In view of the above, sustainable development involves significant improvements to economic, environmental, and social performance. In this regard, the results of this study showed that companies have to evaluate each sustainability dimension separately to assess their actual progression towards sustainability. In other words, an aggregate evaluation could produce misleading results. However, many studies disassociate or ignore some sustainability dimensions (Büyüközkan and Karabulut, 2018; Przychodzen et al., 2016; Sajan et al., 2017; Schiederig et al., 2012), as, despite their importance to the long-term survival of a company, consensus has not been achieved yet on how to obtain them simultaneously. In this sense, the results obtained in the present study contribute to the literature by empirically showing how organizational creativity (which integrates sustainability orientation) and sustainability-oriented innovation simultaneously improve the economic, environmental, and social sustainability performance of SMEs.

On the other hand, capturing the sustainability value is a challenge, as it implies its integration into the core business (Sroufe, 2017). Likewise, sustainability challenges require a fundamental reorientation of businesses (Przychodzen et al., 2016). Consequently, the creative process and innovation process will have unique characteristics resulting from the transformational journey towards the integration of sustainability in all the activities of the firm. Organizational creativity (which integrates sustainability orientation) encompasses creative thinking, creative action, orientation towards creative problem-solving, and the generation of numerous and varied ideas, perspectives, and views (characterized by their originality and usefulness). Sustainability-oriented innovation entails sustainable innovation capacity, innovation openness, and different types of innovation according to the nature and degree of novelty. Accordingly, these constructs show the multidimensional integration of the breadth of sustainability and operationalization of sustainable development. In this regard, such reconfigurations, according to Sroufe (2017), are critical factors in the integration and management of change, and in the need for alignment of sustainability goals, missions, and values.

Sustainability requires changes in companies (Adams et al., 2016), and the configurations thereby obtained lead to the creation of sustainability value and the improvement of economic, environmental, and social performance of firms. Thus, the results of this study offer an explanation for the previous contradictory results regarding the effects of eco-innovation and green innovation on sustainability performance (see, e.g., Ch'ng et al., 2020; Sezen and Cankaya, 2013), along with an explanation of how the balance between creativity and innovation could help achieve sustainability in SMEs. In addition, as creativity and innovation are implemented and deployed in organizations, the

aforementioned process of change and integration –regarding the three sustainability dimensions– has to be applied throughout the organization, including the core business, from which stakeholders and value chains are not independent. This leads to the need for coherence between the activities of a firm and its cooperation with other entities. This argument is emphasized because collaboration is particularly critical in the innovation and organizational creativity of SMEs (Balau et al., 2020).

6.2. Sustainability in the design of organizational creativity and the innovation process

Four key aspects emerged regarding the configurations described for creativity and innovation in relation to the supported hypotheses.

The first of these is the orientation of the creative process towards obtaining applicable and useful outputs for the sustainability of the firm and/or in solving sustainability problems in different areas of the firm. Such orientation could be crucial in overcoming or minimizing the barriers to sustainability for SMEs. Moreover, it is important to maximize the direct and indirect effects of organizational creativity (which integrates sustainability orientation) on sustainability-oriented innovation and the three sustainability performance dimensions, for example, by offering useful and applicable ideas to overcome sustainability challenges.

The second aspect is to include new perspectives and views along with new ideas as outputs of creative process. Mitchell and Walinga (2017) theoretically reasoned that sustainability challenges require not only creative problem-solving but also insight problem-solving. Lozano (2014) indicated that sustainability requires new mental models. In this way, completely new understandings, perceptions, and conceptions of sustainability problems could be reached, broadening the range of applicable ideas or changing the way they are applied, thereby expanding the limits of understanding. In fact, if solutions must go beyond applying or optimizing current models and adjusting the status quo (Przychodzen et al., 2016), new perspectives and views could be the turning point in improving all three sustainability performance dimensions. In this vein, SMEs should make special use of new perspectives and views for expanding mental models, understandings, perceptions, and conceptions, because these offer a way of avoiding possible barriers. Moreover, their application in SMEs could be more accessible because of the flexibility of SMEs. These elements are probably the most significant in the sustainability progression of SMEs and, further, here mainly lies the direct effect of creativity on sustainability performance.

Applicability, utility, creative problem solving, ideas, perspectives, and views form a whole in sustainable development if we consider that (1) the results of the creative process must be applicable, useful, and oriented to problem solving; and (2) taking full advantage of the creative process means benefitting from new perceptions that expand and unlock problem understanding and solution development. Therefore, systemic solutions –for sustainability challenges– emerge unconstrained by established assumptions, and with full consideration of opposing points of view.

The third aspect pertains to sustainability-oriented innovation openness. Sustainability innovation has to be open beyond the boundaries of a firm (Przychodzen et al., 2016;

Inigo and Albareda, 2019) for sustainability-oriented innovation to overcome the boundaries of different spheres of activities and those of the company, and to take full advantage of organizational creativity to, ultimately, have a significant effect on sustainability performance. In this way, the sustainability-oriented open innovation process leverages external knowledge, ideas, and R&D (out-in). Moreover, new ideas can be applied or commercialized outside the company, thereby opening new paths to the market– (in-out). In this vein, increased interaction with external actors is important for the sustainability-oriented innovation of SMEs (Klewitz and Hansen, 2014), as well as that of large companies. Building linkages across existing firm boundaries leads to improved sustainability innovation outputs (Przychodzen et al., 2016). Therefore, openness enables achieving the three sustainability pillars while overcoming some barriers to the sustainability of SMEs.

The fourth aspect concerns the types of innovation according to their nature. Sustainability-rooted business models enable SMEs to take greater advantage of innovation (Klewitz and Hansen, 2014). Souto (2015) regards business model innovation and business concept innovation as the basis for the generation and implementation of other radical and incremental innovations. Accordingly, the types of innovation in sustainability-oriented innovation do not occur in isolation but are interconnected. Such interconnectedness requires considering innovations in product, process, organization, business model, and business concept. Sustainability business model innovation can be a cornerstone of sustainability and, thereby, could help build business models based on the three sustainability pillars.

6.3. Sustainability performance and firm size

Model 1 showed a significant and positive effect of the firm size on economic sustainability performance; however, in model 2, this effect disappeared with the inclusion of sustainability-oriented innovation. Therefore, creativity and innovation, with the configuration described above, enable sustainable development and show that improvement in economic, environmental, and social performance does not depend on firm size. Further, relative to improving sustainability performance, the features of SMEs, as pointed out by Aragón-Correa et al. (2008), Klewitz and Hansen (2014), and Dey et al. (2018), lead to advantages (e.g. easier adoption of new sustainability models because of a flat organization, founder vision, flexibility, and entrepreneurial style) and disadvantages (e.g. lack of resources to carry out cost-intensive projects). Gong et al. (2013) outlined the differences between large and small firms regarding the effect of creativity on performance. Balau et al. (2020) highlighted that creativity tends to be more radical in small firms. Accordingly, although size does not determine sustainability performance, organizational creativity (which integrates sustainability orientation) and sustainability-oriented innovation achieve results that are optimized to each entity's own characteristics and that overcome inherent barriers to the sustainability of SMEs. This is what enables the simultaneous improvement of economic, social, and environmental performance. Based on literature and the results obtained in this study, the aspects that gain relevance in this optimization of the features of SMEs are innovation openness,

business model innovation, radical novelty, high usefulness of creative process outputs, and inclusion of new perspectives and views.

7. Conclusions

This study contributes to the literature by identifying organizational creativity (which integrates sustainability orientation) and sustainability-oriented innovation as critical elements in the progression of companies towards sustainability. These elements emerge as an answer to the sustainability challenges that must be contended by firms. Likewise, both elements must integrate and be configured under the principles of sustainability in all its breadths, while also demanding the integration of the three sustainability dimensions throughout the organization.

The exposed model shows how it is possible to achieve short-term and long-term objectives in SMEs, despite SMEs having more intense competition. In other words, the model outlines a roadmap towards sustainable development where profit growth, sales growth, increased market share, decreased production costs, and increased returns are linked to environmental protection and the enhancement of the quality of life of the community and employees.

7.1. Implications for theory and practice

The challenges posed by sustainability and sustainable development play a prominent role in the agenda of managers and policymakers. However, this is a complex and still partially unexplored path, which requires going beyond applying or optimizing current models and adjusting the current status quo. Creativity is essential to finding new solutions, models, and paths. Reinventing our world, society, and economy to achieve effective sustainability is possible through creativity and innovation. The practical implications of the current study findings show that managers must integrate the three sustainability dimensions in the generation and implementation of organizational creativity, while reconfiguring creative and innovation processes to effectively impact economic, social, and environmental sustainability performance simultaneously. Further, managers must address the alignment and interconnection between organizational creativity and innovation processes. In this way, organizational creativity (which integrates sustainability orientation) and sustainability-oriented innovation emerge as determinant factors in solving sustainability challenges and overcoming barriers to sustainable development, including those typical of SMEs, such as lack of resources. Thereby, a wide spectrum of solutions emerges in response to internal constraints to the improvement of sustainability performance, while competitive advantages arise.

Consequently, three major basic recommendations can be drawn for SMEs and their managers, namely integration, alignment, and linkage. Integrating the three sustainability dimensions into all the activities and aspects of a firm is a critical requirement. Alignment with sustainable development implies reconfiguring of processes and activities. Linkages that connect activities, sustainability actions, and objectives between activities are also required. Undoubtedly, the connection between the creative and innovative processes is necessary to facilitate the solution of sustainability problems, thereby achieving success

in the generation and implementation of ideas. Integration, alignment, and linkage turn creativity and innovation into an engine for sustainability development of the organization.

Moreover, the four previously described aspects regarding the configuration of creativity and innovation are essential for improving the sustainability performance of SMEs. This indicates that SME managers have to (1) direct the creative process towards obtaining applicable and useful results with respect to the firm's sustainability and/or for solving sustainability problems in the different areas of the firm; (2) design the creative process to obtain new ideas, perspectives, and views; (3) design an openness sustainability-oriented innovation process; and (4) interconnect different types of innovation. In addition, all these aspects act on sustainability as a single entity and in an interconnected manner. New ideas, perspectives, and views will lead to new solutions and ways to address sustainability challenges beyond the current understanding, perception, and conception. Organizational creativity (which integrates sustainability orientation) is responsible for the development of new answers, approaches, and solutions that seek to respond to the challenges of sustainable development. Sustainability-oriented innovation provides a means to materialize and reach the market with creative ideas and solutions for sustainability problems, and these are supported by new perceptions and views that help overcome sustainability challenges in a novel manner. This takes the form of new products, processes, organizational methods, business models, and business concepts to improve the sustainability performance of the firm. In this vein, organizational creativity (which integrates sustainability orientation) and sustainability-oriented innovation are the drivers of sustainability change, transformation, and reconfiguration, causing a significant positive impact on economic, social, and environmental sustainability performance. All this is operationalized in creativity through applicability, utility, creative problem-solving, new ideas, perspectives, and views oriented towards sustainability. Regarding innovation, sustainability-rooted openness (both from outside to inside and from inside to outside) and different types of innovation, along with their interactions, are the operationalization pathways. Further, openness provides new paths to the market. However, sustainability-oriented innovation also relies heavily on learning and continuous innovation.

Many new ideas are not useful, and many innovations fail to obtain economic returns. Consequently, new ideas, thoughts, perspectives, views, and mental models must have novelty/originality and usefulness/value in solving sustainability problems if managers aim to use them in improving the sustainability performance of their firm. In this way, sustainability-oriented innovation plays a key role in the useful and valuable utilization of new ideas. However, not all companies are able to obtain the same benefits from a novel idea, making the value and usefulness dependent, in part, on the configuration of the sustainability-oriented innovation process. The results of the current study partially show that not all organizational creativity flows towards sustainability performance through sustainability-oriented innovation. In addition, openness provides new paths to market.

Managers should integrate sustainability orientation into organizational creativity without limiting it, as the new ideas for sustainability application could be vary in nature or context. Such creativity is (1) contextualized in organizations; (2) nourished within and

across firm boundaries; (3) exhibited in ways of thinking, thought patterns, cognitive pathways, viewpoints, connections, ideas, actions, associations, etc.; and (4) characterized by novelty, unusualness, originality, and imagination.

Sustainable development requires companies to assess their sustainability performance, as well as the performance of their innovative and creative processes in this context. In this sense, measurement scales are developed and tested for sustainability-oriented innovation, organizational creativity (which integrates sustainability orientation but is not limited by it), and economic, environmental, and social sustainability performance. These terms address sustainability across all its breadths. In addition, this contribution seeks to enable future research on sustainability dimensions, sustainability-oriented innovation, and organizational creativity in the context of sustainability and minimizing the causes of ambiguity or biases.

7.2. Future research

Future lines of research include analyzing the role of sustainability leadership, sustainability entrepreneurship, sustainability-oriented knowledge management, sustainability-oriented resources and capabilities management (generation, acquisition, allocation, deployment, and exploitation), stakeholder interaction, co-creation, boundary spanning, and cooperation in relation to sustainability-oriented innovation, organizational creativity (including the implementation of creative solutions for sustainability problems), sustainability performance, and sustainability challenges. Other promising future lines are the effect of internal characteristics and internal and external constraints regarding sustainability performance, implementation of creative solutions for sustainability problems, configuration and design of sustainability-oriented innovation, and sustainability-oriented innovation openness.

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